Aalto University
School of Business

Utilization of Business Analytics in Professional Sports Organizations

Bachelor's Thesis
Eetu Nurminen
25.05.2020
ISM Program

Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi
Abstract of Bachelor's thesis

Author Eetu Nurminen

Title of thesis Utilization of Business Analytics in Professional Sports Organizations

Degree Bachelor

Degree programme Information and Service Management

Thesis advisor(s) Tomi Seppälä

Year of approval 2020 **Number of pages** 26 **Language** English

Abstract

This thesis aims to provide an overview on how business analytics can be used in sports organizations. In addition, another objective of this thesis is to study the strategic implementation process of a new technology and the challenges of it from an organizational perspective, and then link it to the adaptation of business analytics. To achieve these objectives, existing literature on the subjects is reviewed. The scope of this research is on professional sports organizations.

The literature review highlights that so far, the academic research has mostly focused on sports analytics instead of business analytics in sports organizations. There is no clear distinction between these two, but this thesis uses a straightforward division where sports analytics refers to the use of analytics in the improvement of sports performance, while business analytics refers to the business operations of a sports organization.

The findings indicate that professional sports organizations can utilize business analytics in four different business areas, which are ticket pricing, sponsorships, customer relationship management and social media. By applying analytical methods to these business areas, sports organizations can improve their revenue and attendance rates, fan engagement and loyalty, and the efficiency of their marketing campaigns. The main finding of this thesis is the interconnected nature of these different business segments: utilizing analytics in one of these segments can potentially also improve another segment.

The findings also emphasize the importance of strategic planning in the implementation of business analytics. The organization has to acknowledge its own current capabilities and resources and understand the challenges they can pose to the implementation process.

To conclude, business analytics provide exciting opportunities for professional sports organizations. However, analytics should not be used just for the sake of doing it, but rather it should be properly planned to successfully achieve the desired benefits.

Keywords Business analytics, Analytics, Data-driven, Sports industry

Table of Contents

1 Introduction

The importance of business analytics has surged rapidly in the current millennium. Businesses are gathering more data than ever before, which has led them to contemplate how that data can be translated into concrete business value (Lavalle et al., 2011). The use of data-driven analysis is widely considered to lead to a more efficient decision-making process while simultaneously improving the business performance of an organization (Waller & Fawcett, 2013).

This data revolution and the increased importance of data analytics is shaping up essentially all industries (Lavalle et al., 2011). In both the business and the academic setting, the focus has been mostly on the more traditional industries, such as finance, healthcare, manufacturing, retail, public sector and energy (Venkatram & Mary, 2017). However, especially in academic research, the sports industry has been a bit left out of the discussion. This lack of academic research of the combination of sports and business analytics came evident when analysing the search results from Scopus. With the search term "business analytics", 1230 results emerged. When adding the search term "sport", only 20 of these 1230 were left, as portrayed in Figure 1.

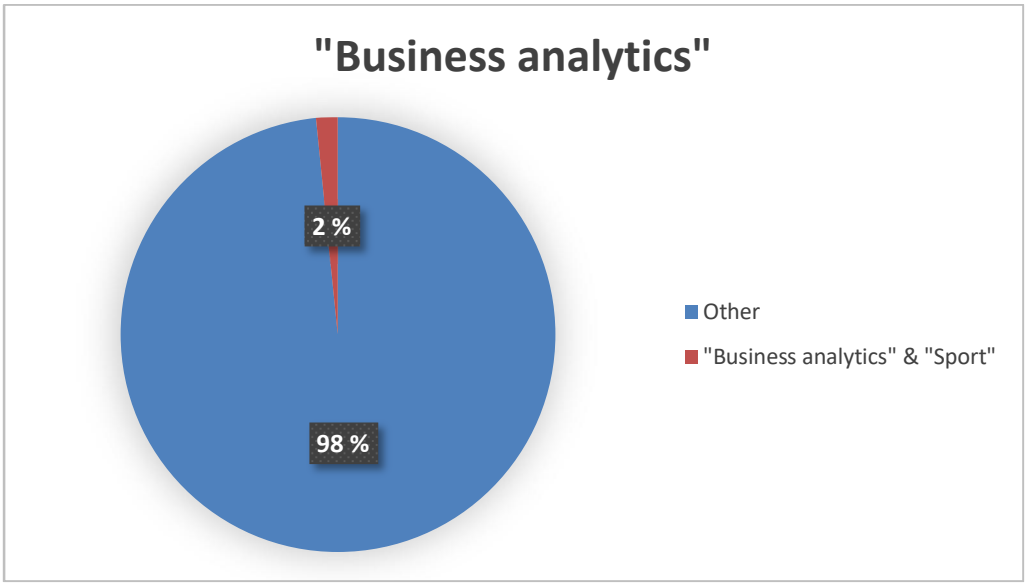

Figure 1. *Scopus search results for "business analytics" and "sport".*

Moreover, in sports, the research of analytics has mostly been focusing on the on-field sports performance analytics, or so-called sports analytics, which also was evident while searching the articles. When searching for results that include both “sports” and “analytics”, 675 results emerged. When adding the word “business”, only 147 were left, portrayed in Figure 2. These above-mentioned search results show clearly the scarcity of academic research of the subject.

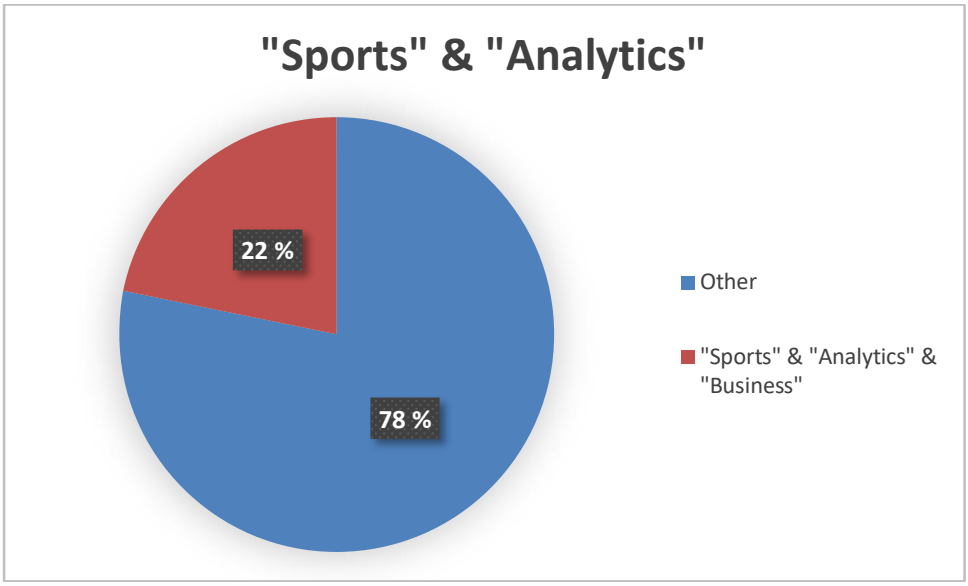

Figure 2. *Scopus search results for “sports & analytics” and “business”.*

The sports industry is an economically significant industry. According to a report by Business Wire (2019), the global sports market was valued at nearly $488,5 billion in 2018. Moreover, according to the report the compound annual growth rate of the sports industry has been 4,3% since 2014, and it is expected to grow at 5,9% to nearly $614,1 billion by 2022. Given the size and the steady growth of the sports industry, and the lack of previous academic research on the subject, the motivation for this thesis arose.

To conclude, this thesis will examine the use and the implementation of business analytics in professional sports organizations.

1.1 Research objectives and research questions

The objective of this thesis is to provide an overview for professional sports organizations on how to improve their business performance with the help of business analytics. To achieve this, relevant academic literature is reviewed to find examples of how sport

organizations are currently utilizing analytics in their business processes. Thus, the main research question of this thesis is:

- How business analytics is currently used by professional sports organizations?

In addition, the objective is to examine how the implementation process of business analytics should be done while avoiding possible pitfalls. Therefore, the secondary research question of this thesis is:

- How sports organizations should approach the implementation of business analytics, and what are the challenges of it?

By researching these two questions, this thesis aims to provide valuable insights for professional sports organizations that are looking to apply some business analytics tools themselves.

1.2 Scope of research

As stated above, this thesis examines the possibilities that data analytics provides on the business performance of professional sports organizations. Thus, the scope of the research is on business analytics even though the difference between business analytics and sports analytics is briefly assessed. Since the focus is on business analytics, amateur sports organizations were excluded from the research due to their non-professional nature. Moreover, this thesis will focus on professional sports teams as organizations instead of professional leagues and associations and so forth.

1.3 Methodology

The methodology used in this thesis is literature review. As the aim of this thesis is to provide an overview of a research subject, a literature review is a highly suitable methodology (Snyder, 2019). To be more precise, a semi-systematic literature review approach is used. According to Snyder (2019), a semi-systematic approach is most suitable for an overview research with broad research questions, which reflects this thesis well.

The reviewed literature was primarily gathered from Scopus and Google Scholar. Journal articles and conference proceedings were the preferred sources, but in addition a few books and internet articles were used as sources. The amount of citations and the quality

of the publication were emphasized when choosing the reviewed articles, but sometimes lesser-known publications had to be resorted to as well since the amount of academic research on the subject is not very high.

1.4 Structure of the research

The rest of the thesis is structured as follows. Chapter 2 provides the theoretical background for this thesis. The main concepts are defined and the theoretical framework for the following chapter is introduced.

Chapter 3 will examine the strategic implementation of business analytics. The characteristics of professional sports organizations are analyzed in the technology-organization-environment framework, and possible challenges that organizations might face in the implementation process are described.

The results of the literature review are discussed in chapter 4. This chapter will first provide a division of key business areas for sports organizations, and then examine more thoroughly on how business analytics can be utilized in each one of them.

Finally, chapter 5 will conclude the thesis. The findings of this thesis, their theoretical and practical relevance, and the limitations of the research are discussed. In addition, suggestions for further research are provided.

2 Theoretical background

This chapter provides the theoretical background for this thesis. The key concept regarding this thesis, business analytics, is explained here basing it first on general data analytics and later briefly making the distinction between business analytics and sports analytics. Finally, the relevant framework for the implementation of new technology in organizations is introduced.

2.1 Data analytics

The term "data" has been on everyone's lips for the last few decades, and its importance in academic research and business world has increased simultaneously (Chen et al., 2012; Fosso Wamba et al., 2015). The amount of data generated in the world today grows at an exponential rate (Danziger, 2017). By itself, data is worthless, and in order to unlock its potential value it needs to be utilized in the decision-making process (Gandomi & Haider, 2015). To achieve that, data analytics needs to be used. Gandomi and Haider (2015) define data analytics as the "techniques used to analyze and acquire intelligence from big data" (p. 140). The possibilities of data analytics have evolved in parallel with the rapid development of technology, as more complicated and sophisticated analytical tools can be utilized with modern advanced technologies (Holsapple et al., 2014; Russom, 2011). By its nature, data analytics can be either descriptive, diagnostic, predictive or prescriptive. Descriptive analytics tells what is happening now, diagnostic determines why it is happening, predictive analyses what will probably happen and finally prescriptive gives suggestions and recommendations on what needs to be done, which is why it is considered as the most valuable kind of analytics. (Venkatram & Mary, 2017).

2.2 Business analytics

Continuing from the introduction of data analytics, business analytics can be defined. Chen et al. (2012) define business analytics as "the techniques, technologies, systems, practices, methodologies, and applications that analyze critical business data to help an enterprise better understand its business and market and make timely business decisions" (p. 1166), while Holsapple et al. (2014) propose that business analytics is "concerned with evidence-based problem recognition and solving that happen within the context of business situations." (p. 134). In addition, in their research Holsapple et al.

(2014) recognize several different business analytics disciplines, which include but are not limited to for example marketing- , customer- , human resource- , supply chain- , risk- and financial analytics. Combining these different definitions, this thesis defines business analytics as the use of various analytical methods and tools to assist and improve the decision-making of businesses.

2.3 The difference between sports analytics and business analytics in sports industry

The general concepts of data analytics and business analytics were defined in the previous chapters. Often, as the introduction chapter of this thesis suggests, the term sports analytics is used in the context of analytics use in sports. In one of the most notable academic article about the use of analytics in the sports industry, Davenport (2014) identified three different dimensions of sports analytics: player and game performance, business analytics in sports, and player health and injury analytics. In their conference paper, Tan et al. (2017) have in turn mixed up Davenport's division: in addition to business analytics, they combined performance analytics with health analytics and introduced event management as a new segment. This thesis uses elements from both of these divisions, and uses only two, slightly broader segments: sports analytics and business analytics, with sports analytics referring to analytics used to improve the athletic performance (e.g. scouting and tactics) and health and injury analytics, while business analytics refers to the definition introduced above, also including the event management. Although the player recruitment process could also be considered as a business operation, the division suggested in this thesis includes it in the sports analytics segment and therefore excludes it from the research. Further in this thesis, the terms "analytics" and "data analytics" refer to business analytics.

2.4 Technology-organization-environment framework

To examine the strategic implementation of new business analytics approaches by sports organizations, the technology-organization-environment framework (TOE) is used as a basis for research. TOE was developed by Tornatzky and Fleischer (1990), and it is used to describe the aspects that influence the adoption of technology in companies, and how the technological, organizational and environmental contexts influence that. These three contexts provide "both constraints and opportunities for technological innovation" (Tornatzky & Fleischer, 1990, p. 154).

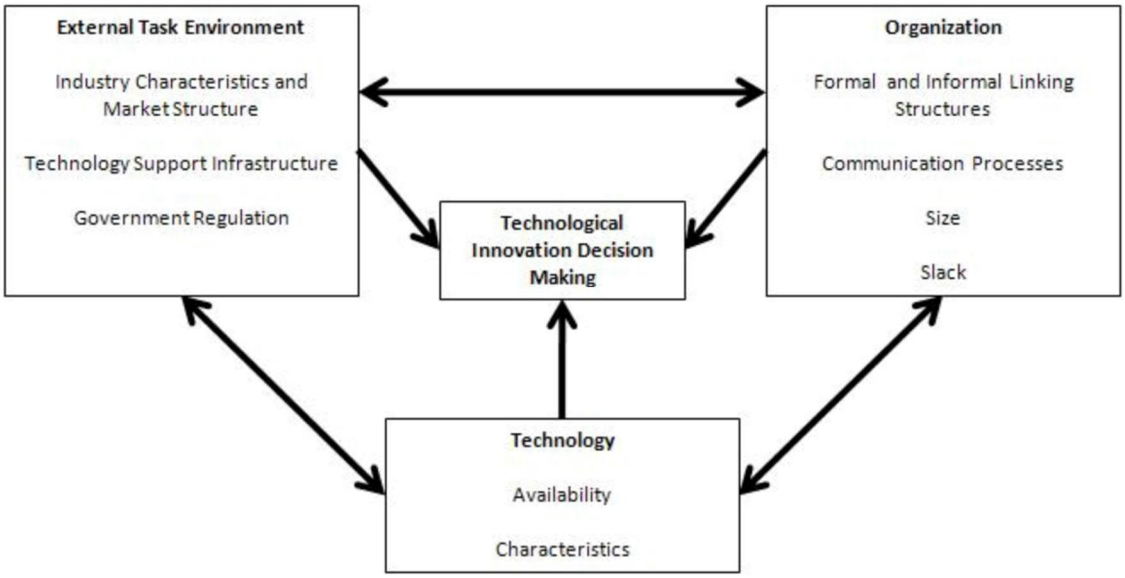

Figure 3. *Technology-organization-environment framework (Tornatzky & Fleischer, 1990).*

The TOE framework (shown in Figure 3) has been widely used in IS research and it has a stable empirical backing (Zhu et al., 2002). Thus, this thesis aims to adapt this framework to the sports industry, which is done in the following chapter.

3 Strategic implementation of business analytics in professional sports organizations

A well-thought, strategic planning is behind every good implementation of analytics. Organizations that have a strategic plan with analytics are more likely to succeed. (Ransbotham et al., 2016). This chapter will first examine the adoption of business analytics in sports organizations from the perspective of the TOE framework. Additionally, some of the possible challenges that organizations might have in the process are observed, and solutions for them are presented.

3.1 Technology-organization-environment analysis for sports industry

The technological context of TOE includes the availability and characteristics of relevant internal and external technologies (Tornatzky & Fleischer, 1990). As mentioned in chapter 2 of this thesis, the amount of data and different analytical tools is constantly growing, and thus the external availability is there for sports organizations. However, the internal availability is highly depended on the organization; bigger teams with more resources have better possibilities of acquiring the needed analytical tools and staff. In addition, Davenport (2014) points out that most of the data analytics used in sports organizations are descriptive nature, while predictive and prescriptive analytics would offer valuable more insights.

The organizational context of TOE refers to different characteristics of the company, such as the structure, size and the amount of resources (Tornatzky & Fleischer, 1990). Similar to the internal availability of technology, the organizational structure can vary a lot between different organizations, and it is difficult to analyze without focusing on any specific organization. However, some general assumptions can be made. Sports organizations are usually small compared to “regular” businesses (Davenport, 2014). Moreover, the managers have a large role in the decision-making of sports organizations, which is why their view of analytics is important to get the implementation process started in the first place (Caya & Bourdon, 2016; Davenport, 2014; Troilo et al., 2016).

The environmental context of TOE includes for example the industry characteristics and the macroeconomic environment (Tornatzky & Fleischer, 1990). The external environment of sports organizations is increasingly positive about analytics. Business analytics are being used a lot in many other industries, but in the sports industry the

focus has been mostly on sports analytics (See, for example Davenport, 2014; Troilo et al., 2016). The regulatory environment of analytics is evolving simultaneously with the technological development. One regulatory and ethical aspect of data analytics is the element of privacy: how closely people's private data should and could be observed (Egebjerg et al., 2017). Moreover, the question of who actually owns that data can be asked.

To conclude the preconditions for the implementation of business analytics exist in the sports industry. However, as the focus of this study is the broader industry-wide context instead of any specific organization, the TOE framework has limitations.

3.2 Possible challenges and their solutions

Although the implementation of business analytics would be beneficial to a vast majority of sports organizations, there are some challenges and obstacles in the adaptation process that they have to account for.

The literature paints a clear picture that often there is a noticeable gap between the perception and the reality of value obtained by analytics; the actual impact of business analytics is harder to understand (Troilo et al., 2016). As suggested by Harrison and Bukstein (2016, p. 5), a clear data visualization should be used to make the results of data analytics easier for the managers to understand. Moreover, as the analytical methods get more complex, the more important the role of communication becomes. These gaps in the perception of analytics can be filled with better communication between the analytics and the management teams (Harrison & Bukstein, 2016, pp. 18-20).

Speaking of the management, the traditional management culture that exists in many sports organizations can cause challenges to the implementation of analytics. Sport managers may choose trust their instincts and acquired experience even if there would be better, data-driven decisions available. (Davenport, 2014). Consequently, the leading sports organizations in analytics usually share the fact that their top managers are avid supporters of analytics, a good example being Daryl Morey, the general manager of the NBA team Houston Rockets (Caya & Bourdon, 2016). Moreover, as the required analytical skill levels of the managers and the employees increases, both internal and external cooperation is needed. Internal cooperation, as Davenport (2014) suggests, can be for example the merging of the sports analytics and the business analytics teams, as the required skills are more or less the same in both of them. However, as Davenport (2014) and Bouchet et al. (2016) suggest, the majority of professional sports

organizations are relatively small businesses that can't afford large analytics departments. Therefore, external cooperation is often needed as well. Sport organizations can form partnerships with external analytics firms and consultants and so forth to address the lack of own knowledge or resources (Davenport, 2014).

4 Business analytics in the sports industry

The sports industry has started to adopt more analytical, data-driven decision-making later than many other industries. Until recently, the focus has been mostly on the sporting decisions, such as game tactics and player recruitment. (Troilo et al., 2016). However, during the recent years, the popularity of business analytics initiatives in the sports industry has increased (Jensen & Turner, 2017). Professional sports organizations have multiple different business areas, such as ticketing, corporate partnership, customer relationship management, fan engagement and social media (see, for example: Davenport, 2014; Harrison & Bukstein, 2016, p. 7; Troilo et al., 2016) to utilize business analytics on. By combining findings from the literature reviewed, this thesis divides these different business areas into four different segments, which are ticket pricing, sponsorships and corporate partnerships, customer relationship management and marketing, and social media analytics. These segments are highlighted in Figure 4.

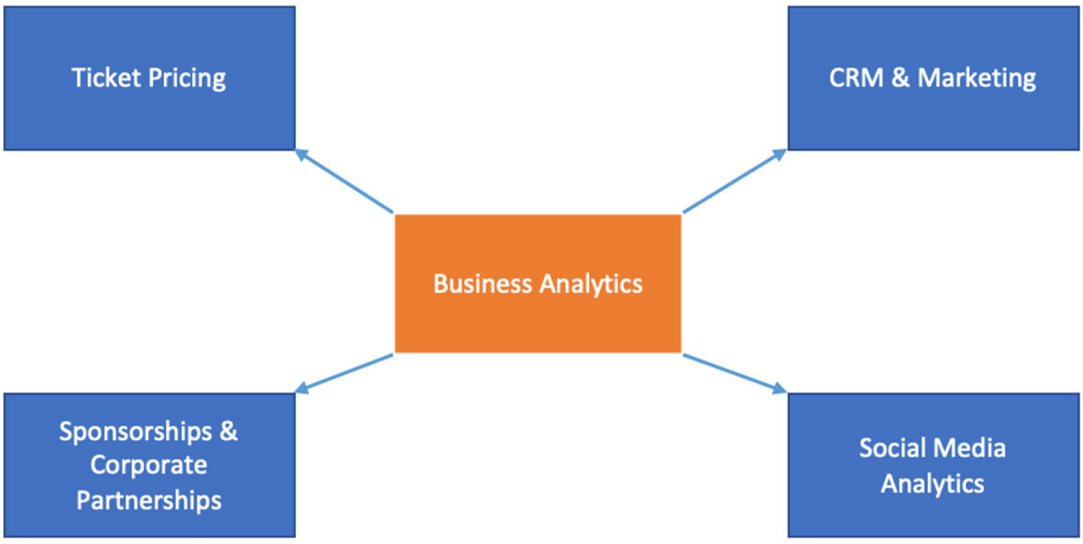

***Figure 4**. Different business segments of sports organizations where business analytics can be used.*

These four segments are the most relevant business areas for professional sports organizations, and some form of business analytics can be utilized in all of them. The following chapters will examine these different segments and their analytical possibilities more thoroughly.

4.1 Ticket pricing

As suggested by Willie (2017), ticket sales are one of the key sources of revenue for professional sports organizations. In the past, most of the professional sports organizations used a fixed pricing structure for their ticket sales. Either the prices for every ticket were the same, or more commonly, the prices varied regarding to the location of the seat. The unifying factor was that the prices were set already early on before the season and they were the same for every game. During the recent couple of decades, as the fixed operational costs of sports organizations, such as player salaries are increasingly rising, the organizations have been searching for ways to gain more revenue to cover for those increasing costs. (Drayer et al., 2012).

Optimizing ticket prices with the help of analytics is one way that a lot of organizations have used to tackle the issue (Davenport, 2014). There are essentially two approaches to analytical ticket pricing: variable and dynamic pricing. As a lot of the analytical innovations in the sports industry, variable ticket pricing was first used by an MLB team, the Colorado Rockies in 1999. In variable pricing (VTP), the prices of the seats can vary based on factors such as the day of the week or the quality of the opponent. However, as was the case in the earlier-mentioned fixed pricing structure, the prices are set before the season, which may still lead to pricing inefficiencies. (Drayer et al., 2012). To be able to react better to the dynamically changing consumer demand, some professional sports organizations have started to experiment with dynamic ticket pricing (DTP) (Shapiro & Drayer, 2014). The features of DTP will be examined more thoroughly in the following chapter.

4.1.1 Dynamic ticket pricing

Although dynamic pricing is a relatively new concept in the sports industry, it has been used for example in the airline and hotel industries already for decades (Drayer et al., 2012; Shapiro & Drayer, 2014). The commercial airline industry has been widely regarded as the industry that originally started the emerging of dynamic pricing practices (Willie, 2017.). The goal of dynamic ticket pricing is to adjust ticket prices continually (e.g. daily), based on different dynamic variables such as the current form of the opponent and the own team, an individual player being in-form, team health and even the weather. This allows the organizations to meet the consumers' demand and their willingness-to-pay more accurately, which can potentially lead to improved revenue. (Shapiro & Drayer, 2014). In addition to the incremental value generated straight from the ticket sales, dynamic pricing can also improve the stadium attendance rates,

which in turn provides a better fan experience and generates more ancillary revenues (e.g. parking, merchandise, food and beverage sold) (Drayer et al., 2012; Kemper & Breuer, 2016).

According to multiple studies, dynamic pricing methods can be effectively applied to sports events because they meet all the traditional characteristics of differential pricing. These characteristics are fixed capacity, perishable inventory, high fixed costs and low variable costs, and fluctuating but at the same time relatively forecastable demand. (Drayer et al., 2012; Willie, 2017). One thing that has been influential in the popularization of dynamic ticket pricing practices has been the emergence of the online secondary ticket market. First of all, the increased competition from secondary ticket market platforms forces sports organizations to rethink their pricing strategies. Additionally, the secondary market provides the organizations with more data that can be used for more thorough analysis of consumer demand at different price levels. Moreover, as the prices in the secondary market tend to change often when compared to the fixed-priced tickets the sports clubs used to primarily sell, the fans (the consumers in this case) are less resistant to dynamically changing ticket prices. (Bouchet et al., 2016; Shapiro & Drayer, 2014).

4.1.2 Results of the implementation of DTP

This subsection will provide the reader with some results from academic research on DTP and the results that some sports organizations have had after implementing dynamic ticket pricing strategies, while also highlighting a few challenges that it may cause.

The first professional sports organization to use dynamic ticket pricing was the MLB team San Francisco Giants in 2009. At first, they used dynamic pricing only for 2000 seats, which resulted in about $500,000 in incremental revenue. In 2010, all of their tickets were priced dynamically, which resulted in a 7% increase of revenue. (Sports Business Journal, 2011). After the Giants, more and more teams from the major North American leagues have implemented DTP (Harrison & Bukstein, 2016, p. 9).

In their paper, Xu et al. (2015) compared different pricing strategies with a demand model they developed and applied to actual ticket data from an anonymous MLB team. The results showed that the dynamic pricing strategy that the team used actually resulted in a 0,79% lower revenue comparing to a fixed pricing strategy. However, they found that with a better designed dynamic pricing strategy, the revenues could have increased by as much as 14,3%. Xu et al. (2019) had similar findings in their paper. They found that an

anonymous MLB team's revenue was 0,5% lower with dynamic pricing compared to fixed pricing. Moreover, they found that by tweaking the pricing strategy a bit the revenue could increase to 17,2%. Both of these papers agreed on one thing: in order to achieve the desired revenue increases through dynamic pricing, the pricing has to be flexible enough, and the prices should be allowed to also decrease, which was not the case in the MLB teams which were studied. Thus, this thesis suggests that it is not enough to simply implement any dynamic ticket pricing strategy just for the sake of it, but the details should be thoroughly examined to reap the full benefits and to avoid any possible revenue decreases.

4.2 Sponsorships and corporate partnerships

In addition to ticket sales, sponsorships and corporate partnerships are key sources of income for professional sports organizations (Willie, 2017). As a major area of focus for business managers, a lot of untapped potential for business analytics exist. However, since the use of analytics in corporate partnership evaluation in the sports industry is still limited, there is just a small number of academic research on it.

For the most part, professional sports organizations have been fairly traditional in their sponsorship processes. When analysing the revenue forecasts of current and future sponsorships, many organizations have used the same practice of renewal rate for decades now. (Jensen & Turner, 2017). As Jensen and Turner (2017) suggest, the renewal rate does not provide much of relevant information for sport organizations. It just shows the historical percentage of sponsors that renewed their sponsorships, without addressing the actual or expected length of these partnerships, or when they are most likely to dissolve. Thus, more analytical measures should be used to analyse sponsorships. In their paper, Jensen and Turner (2017) applied quantitative event history analysis approaches to find out more details about Olympic and World Cup sponsorships. They found that because the traditional renewal rate method does not account for sponsorships that are currently ongoing, it can cause significant distortions to the revenue forecasts. Additionally, in 2016, the NBA team Orlando Magic expanded the traditional renewal rate to find corporate partners who would be most likely to renew by analysing the insights they gathered from targeted fan surveys that they developed (Harrison & Bukstein, 2016, p. 17). These examples highlight the fact that analytics can provide more insight to traditional and outdated approaches to sponsorships.

In their article, Lee and Ross (2012) examined the decision making process of sport sponsorships in a global context. They propose that analytic hierarchy process (AHP) can be used for decision making also when choosing the right sponsorship partners. AHP is a mathematical decision-making tool, in which the ultimate goal (decision) is divided into smaller and easier-to-handle problems, which are assigned with numerical weights that can be then compared to aid the decision making (Saaty, 2002). In their research, Lee and Ross (2012) studied the problem from the corporate sponsors' point of view, and in their AHP model they included a criteria of "sport team factors", with sub-criterias such as fan base strength and facility average attendance. However, as they suggest, this model can be also used by sports teams to understand the needs of corporate partners better and consequently make them more attractive in the eyes of the potential partners. Moreover, a connection between dynamic ticket pricing and sponsorship analytics can be made: successful use of dynamic pricing improves the facility average attendance (Kemper & Breuer, 2016) which in turn makes the team more attractive for sponsors according to the AHP-model of Lee and Ross (2012). Thus, it is beneficial to combine the use of business analytics to more than one business area.

Another way analytics can be used to increase the attractiveness of a sport team in the eyes of a sponsor is to provide help with measuring the return on investment (ROI). Even though the significance of sponsorships, business managers do not often have a clear understanding of the outcomes of sponsorships and can even be sceptical about the value of them. (Kim et al., 2015). Moreover, a report published by IEG (2015) shows that sponsoring firms who took part in their survey recognized the assistance in measuring the ROI as the most valuable service that a sponsored partner can provide. Considering how general and simple the concept of ROI seems to be, first it was a little surprising to see how unfamiliar managers were with it. Yet, during the literature review it came evident that there is no real consensus on how the ROI of sponsorship deals should be measured in academic research either. In their article, Jensen and Cobbs (2014) utilized data analytics to examine sponsorships in Formula One, and they found strong correlation between the sponsored team's performance and both the sponsor's brand exposure and price they paid for the sponsorship. To offer more means to measure ROI, Jacobs et al. (2014) introduced five metrics that should be measured: cost per reach, unaided awareness per reach, sales/margin per dollar spent, long-term brand attributes and indirect benefits. In addition, they highlighted the value-adding opportunities that analytical ROI measurement provides, which seems to be the consensus in academic research.

4.3 Customer relationship management and marketing

Every business needs customers to operate. When it comes to sports organizations, their fans are their main customers (Hunt et al., 1999). Thus, in this thesis the term "customer relationship management" refers to all kinds of business activities concerning the fans, such as fan segmenting and personalization and fan engagement (Davenport, 2014).

Analytical methods are extremely helpful in fan segmentation and creating highly personalized marketing approaches (Zhou & Huang, 2018). From these targeted marketing initiatives, sports organizations can attain valuable customer data to aid them in other business segments. For example, a Deloitte report (2016) suggests that teams can enhance fan engagement by personalizing, which is also supported by Harrison and Bukstein (2016, pp. 11-14). However, as Davenport (2014) acknowledged, at the time of writing his article there were not many teams that were utilizing analytical methods in marketing. One exception he mentioned was the Major League Baseball Advanced Media (MLBAM), which applies statistical tools to create personalized content and ads. Segmentation and personalization analytics can be also used to identify season ticket holders based on their likelihood of renewing the season ticket and then creating personalized messages for them for a higher chance of renewal (Davenport, 2014; Harrison & Bukstein, 2016, p. 11).

A good way for sports organizations to segment consumers is by the level of fan identification. As defined by Sutton et al. (1997), fan identification is "the personal commitment and emotional involvement customers have with a sport organization" (p.15). A high level of identification has various benefits to the business outcomes of sport organizations. First of all, a highly identified fan has decreased price sensitivity, which again connects to the ticket pricing: fans are less likely to resist higher priced tickets, and they are more likely to commit to buying a season ticket early before the season (Sutton et al., 1997). In his study, Willie (2017) also highlighted the relationship between ticket sales and fan loyalty, while also adding the improved merchandise sales of a team to the list of benefits from increased fan loyalty. Moreover, fan identification segmentation can be used as an aid sponsorship management. Depending on the objectives of the sponsor, they can either target the highly identified fans due to their greater sponsor recognition or the fans with lower identification due to their bigger need of additional promotion from the sponsor. (Gwinner & Swanson, 2003). This again emphasizes the connection between these different business segments, which is also supported by Harrison and

Bukstein (2016). They suggest that data from market research can be used to support for example ticket sales and the fan experience (p.17).

4.4 Social media analytics

The phenomenon of social media has exploded in the 2000s. Already in 2009, Facebook had more than 175 million active users, and 10 hours of video content was uploaded to YouTube every minute (Kaplan & Haenlein, 2010). The enormous number of users provides businesses with great opportunities to take advantage of business analytics in their social media operations.

4.4.1 Social media marketing

There exists plenty of academic research and concrete examples from sports organizations on the use of analytics in social media marketing. According to Zhou and Huang (2018), "social media has become the main marketing mode" (p.23) in the sports industry. By analyzing different metrics such as number of followers, website views and the extensiveness of consumer engagement, sports organizations can improve the effectiveness of their social media marketing campaigns (Harrison & Bukstein, 2016, p. 14). For example, data from Twitter can be used to inspect a sport organization's followers' peak activity times to guide the organization on when they should post their campaigns (Naraine et al., 2019).

Social media analytics allow sports organizations to personalize and target their marketing campaigns more efficiently. For example, Bogaert et al. (2017) discovered that numerous different algorithms (e.g. neural networks, logistic regression and random forest) can be used on Facebook data to identify relevant target prospects for advertising campaigns. In their study, they succesfully indentified soccer players from Facebook, highlighting the possibilities for targeted marketing. In addition to Facebook, Twitter data can be also used to unravel users' demographics and interests for marketing insights (Naraine et al., 2019).

4.4.2 Social media analytics as an aid to sponsorship

As was suggested earlier in this thesis, utilizing analytics in the evaluation of sponsorships is not a simple task. Fortunately, social media analytics can be helpful in that sense too.

Both the corporate sponsor and the sponsored sports club can gain beneficial insights from social media. For example, text mining analytics can be used to examine sponsorship activation (Abeza et al., 2014). In addition, consumer engagement can be analysed for example from the amount of time spent watching sponsored video content (Harrison & Bukstein, 2016, p. 15). To get even more insightful feedback on brand image, reach and consumer engagement, visual analytics can be used on Twitter to detect consumers' use of sponsor's or the sport team's logos (Hoeber et al., 2016; Jensen et al., 2015).

A lot of the current academic research on social media analytics in sports industry has focused on Twitter and Facebook analytics. Other, newer social medias that are on the rise (e.g. Instagram) offer interesting opportunities for future research.

5 Discussions and conclusions

The objective of this thesis was to examine the use and the implementation of business analytics in professional sports organizations. The objective arose from the lack of both academic and practical research of the topic. This objective was supported with two research questions, which were:

- How business analytics is currently used by professional sports organizations?
- How sports organizations should approach the implementation of business analytics, and what are the challenges of it?

These research questions were studied with a semi-structured literature review. The findings regarding to the primary research question are that business analytics can be used in plenty of different business segments. The four key segments identified in this thesis were ticket pricing, sponsorships and corporate relationships, customer relationship management and marketing, and social media. Business analytics can be used in these segments to price tickets dynamically, evaluate sponsorships more accurately and to segment fans for more precise marketing in both traditional and social media setting. Even though the concrete effects of these different analytical methods can be sometimes hard to evaluate, the common consensus from the reviewed literature is that if done correctly, business analytics indeed offers good opportunities to improve the business outcomes of sports organizations.

The key finding of this thesis was that often the use of business analytics in more than one of these segments offered complementary value, and in that sense, they are connected to each other. For example, using analytical tools in CRM and social media can also boost ticket sales and give better insights to sponsorships (see, for example Gwinner & Swanson, 2003; Harrison & Bukstein, 2016; Willie, 2017; Hoeber et al., 2016; Jensen et al., 2015). Therefore, this thesis suggests that business analytics should be used diversely to maximize the benefits of it. To demonstrate this interconnected relationship of the different business segments, Figure 4 was modified, and this new relationship of the segments is shown in Figure 5.

***Figure 5**. The interconnected relationship of the different business segments.*

In addition to literature review, the secondary research question was analyzed with a help of theoretical framework of technology-organization-environment. The findings indicate that there are various challenges and obstacles, such as the traditional mindset of sports managers and the insufficient resources, that sports organizations need to be prepared for (Davenport, 2014). However, these obstacles can be conquered, and the general conditions for the success of business analytics exist in the sports industry. Moreover, this thesis agrees with previous literature on the importance of careful strategic planning in the implementation of business analytics.

The literature review raised some questions about the future of business analytics in the sports industry. The current analytical level of many sports organizations is relatively low, and therefore the analytical methods and tools described in this thesis are not the most advanced or complicated from a technological perspective. As the available technology and the analytical capabilities of sports organizations progress, it simultaneously offers new opportunities for business analytics, and interesting possibilities for future research: What's next?

5.1 Implications to research

This thesis provides an overview for the different business analytics strategies of sports organizations. The literature review highlights that most of the literature is focused on a more precise area, such as ticket pricing. Therefore, the findings of this thesis include a lack of research on the broad context of business analytics in sports organizations. Furthermore, there is plenty of room for future research in the use of analytics in some of the specific business segments of sports organizations, especially in sponsorships and corporate partnerships. Additionally, the limitations of the technology-organization-environment framework in general analysis were highlighted.

5.2 Implications to practice

The findings of this thesis were that the utilization of business analytics can improve the business outcomes of professional sports organizations, but with a couple of preconditions. First of all, it is not sufficient to only just implement analytical methods but what matters is how it is done. Secondly, a strategic approach to the implementation increases the likelihood of its success. The key for sports organizations that are looking to explore business analytics is to carefully analyze their own organization to find out their biggest challenges and the most suitable analytical methods for them. After the initial implementation, constant evaluation should be done to ensure that the selected analytics are actually beneficial.

5.3 Limitations and future research

The aim of this thesis was to provide a general overview of the subject. Thus, the findings of this thesis are not directly applicable to any specific sports organization, but rather they provide a broader framework that can be used to aid the strategic analysis of a particular organization. In addition, only one framework was used to analyze the strategic implementation process. Moreover, since the subject of the research is relatively new, the amount of respectable academic literature is relatively low. Therefore, in addition to the future research possibilities mentioned in the implications to research -chapter, more research possibilities will arise as the business analytics technologies are developing and becoming more established in the sports industry. Furthermore, an interesting avenue for future research would be to study if business analytics are more suitable for any specific sports or leagues or so forth, and if yes, why so.

References

Abeza, G., Pegoraro, A., Naraine, M. L., Séguin, B., & O'Reilly, N. (2014). Activating a global sport sponsorship with social media: An analysis of TOP sponsors, twitter, and the 2014 Olympic Games. *International Journal of Sport Management and Marketing*, *15*(3–4), 184–213.

Bogaert, M., Ballings, M., Hosten, M., & Van Den Poel, D. (2017). Identifying soccer players on facebook through predictive analytics. *Decision Analysis*, *14*(4), 274–297.

Bouchet, A., Troilo, M., & Walkup, B. R. (2016). Dynamic pricing usage in sports for revenue management. *Managerial Finance*, *42*(9), 913–921.

Caya, O., & Bourdon, A. (2016). A framework of value creation from business intelligence and analytics in competitive sports. *Proceedings of the Annual Hawaii International Conference on System Sciences*, *2016-March*, 1061–1071.

Chen, H., Chiang, R. H. L., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly: Management Information Systems*, *36*(4), 1165–1188.

Danziger, C. (2017). *The exponential growth of data*. Inside Big Data. Retrieved April 26, 2020, from https://insidebigdata.com/2017/02/16/the-exponential-growth-of-data/

Davenport, T. H. (2014). Analytics in sports: The new science of winning. *International Institute for Analytics*, *2*(February), 1–28.

Drayer, J., Shapiro, S. L., & Lee, S. (2012). Dynamic Ticket Pricing in Sport: An Agenda for Research and Practice. *Sport Marketing Quarterly*, *21*(3), 184–194.

Egebjerg, N. H., Hedegaard, N., Kuum, G., Mukkamala, R. R., & Vatrapu, R. (2017). Big Social Data Analytics in Football: Predicting Spectators and TV Ratings from Facebook Data. *Proceedings - 2017 IEEE 6th International Congress on Big Data, BigData Congress 2017*, 81–88.

Forty under 40 - Barry Kahn. (2011). *Sports Business Journal*, *27*(2), 48. Retrieved April 24, 2020, from https://www.sportsbusinessdaily.com/Journal/Issues/2011/03/21/Forty-Under-40/Barry-Kahn.aspx

Fosso Wamba, S., Akter, S., Edwards, A., Chopin, G., & Gnanzou, D. (2015). How "big data" can make big impact: Findings from a systematic review and a longitudinal case study. *International Journal of Production Economics*, *165*, 234–246.

Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, *35*(2), 137–144.

Gwinner, K., & Swanson, S. R. (2003). A model of fan identification: Antecedents and sponsorship outcomes. *Journal of Services Marketing*, *17*(3), 275–294.

Harrison, C. K., & Bukstein, S. (2016). Sport business analytics: Using data to increase revenue and improve operational efficiency. In *Sport Business Analytics: Using Data to Increase Revenue and Improve Operational Efficiency*. CRC Press.

Hoeber, O., Hoeber, L., El Meseery, M., Odoh, K., & Gopi, R. (2016). Visual Twitter Analytics (Vista): Temporally changing sentiment and the discovery of emergent themes within sport event tweets. *Online Information Review*, *40*(1), 25–41.

Holsapple, C., Lee-Post, A., & Pakath, R. (2014). A unified foundation for business analytics. *Decision Support Systems*, *64*, 130–141.

Hunt, K. A., Bristol, T., & Bashaw, R. E. (1999). A conceptual approach to classifying sports fans. *Journal of Services Marketing*, *13*(6), 439–452.

Jacobs, J., Jain, P., & Surana, K. (2014). Is sports sponsorship worth it ? *McKinsey Quarterly*, *June*, 1–3. Retrieved April 18, 2020, from https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/is-sports-sponsorship-worth-it

Jensen, J. A., & Cobbs, J. B. (2014). Predicting return on investment in sport sponsorship: Modeling brand exposure, price, and ROI in formula one automotive competition. *Journal of Advertising Research*, *54*(4).

Jensen, J. A., & Turner, B. A. (2017). Advances in sport sponsorship revenue forecasting: An event history analysis approach. In *Sport Marketing Quarterly* (Vol. 26, Issue 1, pp. 6–19).

Jensen, R. W., Limbu, Y. B., & Spong, Y. (2015). Visual Analytics of Twitter Conversations about Corporate Sponsors of FC Barcelona and Juventus at the 2015 UEFA Final. *International Journal of Sports Marketing and Sponsorship*, *16*(4), 3–9.

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, *53*(1), 59–68.

Kemper, C., & Breuer, C. (2016). How efficient is dynamic pricing for sport events? Designing a dynamic pricing model for Bayern Munich. In *International Journal of Sport Finance* (Vol. 11, Issue 1, pp. 4–25).

Kim, Y., Lee, H. W., Magnusen, M. J., & Kim, M. (2015). Factors influencing sponsorship effectiveness: A meta-analytic review and research synthesis. *Journal of Sport Management*, *29*(4), 408–425.

Lavalle, S., Lesser, E., Shockley, R., Hopkins, M. S., & Kruschwitz, N. (2011). Big Data , Analytics and the Path From Insights to Value Big Data , Analytics and the Path From Insights to Value. *MIT Sloan Management Review*, *52*(52205).

Lee, S., & Ross, S. D. (2012). Sport sponsorship decision making in a global market : An approach of Analytic Hierarchy Process (AHP). *Sport, Business and Management: An International Journal*, *2*(2), 156–168.

Naraine, M. L., Wear, H. T., & Whitburn, D. J. (2019). User engagement from within the Twitter community of professional sport organizations. *Managing Sport and Leisure*, *24*(5), 275–293.

Ransbotham, S., Kiron, D., & Prentice, P. (2016). Beyond the hype: The hard work behind analytics success. *MIT Sloan Management Review*, *57*(3), 6–6. Retrieved April 19, 2020, from https://sloanreview.mit.edu/projects/the-hard-work-behind-data-analytics-strategy/

Redifining home field advantage - A game plan for enhanching fan engagement. (2016). Deloitte. Retrieved May 25, 2020, from https://www2.deloitte.com/content/dam/Deloitte/us/Documents/consumer-business/us-cb-redefining-home-field-advantage-final.pdf

Russom, P. (2011). *BIG DATA ANALYTICS FOURTH QUARTER 2011 TDWI RE SE A RCH Co-sponsored by BIG DATA A N A LY TIC S FOURTH QUARTER 2011 TDWI BEST PRACTICES REPORT Introduction to Big Data Analytics*. Retrieved April 24, 2020, from https://vivomente.com/wp-content/uploads/2016/04/big-data-analytics-white-paper.pdf

Saaty, T. L. (2002). Decision making with the Analytic Hierarchy Process. *Scientia Iranica*, *9*(3), 215–229.

Shapiro, S. L., & Drayer, J. (2014). An examination of dynamic ticket pricing and secondary market price determinants in Major League Baseball. *Sport Management Review*, *17*(2), 145–159.

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, *104*, 333–339.

Sports - $614 Billion Global Market Opportunities & Strategies to 2022 - *ResearchAndMarkets.com*. (2019). Business Wire. Retrieved March 20, 2020, from https://www.businesswire.com/news/home/20190514005472/en/Sports---614-Billion-Global-Market-Opportunities

Sutton, W. A., McDonald, M. A., & Milne, G. R. (1997). Creating and fostering fan identification in professional sports. *Sport Marketing Quarterly*, *6*, 15–22.

Tan, F., Hedman, J., & Xiao, X. (2017). *Sports Analytics and Leadership: Case of BMFC*. 1–5.

Tornatzky, L., & Fleischer, M. (1990) The process of technology innovation. Lexington, MA, Lexington Books.

Troilo, M., Bouchet, A., Urban, T. L., & Sutton, W. A. (2016). Perception, reality, and the adoption of business analytics: Evidence from North American professional sport organizations. *Omega (United Kingdom)*, *59*(March), 72–83.

Ukman, L. (2015). *IEG´s guide to sponsorship: Everything you need to know about sports, arts*. Retrieved April 18, 2020, from www.sponsorship.com

Venkatram, K., & Mary, A. G. (2017). Review on big data & analytics - Concepts, philosophy, process and applications. *Cybernetics and Information Technologies*, *17*(2), 3–27.

Waller, M. A., & Fawcett, S. E. (2013). Data science, predictive analytics, and big data: A revolution that will transform supply chain design and management. *Journal of Business Logistics*, *34*(2), 77–84.

Willie, P. A. (2017). Revenue management for Canadian professional sports organizations. In *Worldwide Hospitality and Tourism Themes* (Vol. 9, Issue 4, pp. 451–463).

Zhou, X., & Huang, F. (2018). *Study of the Sports Precision Marketing Model under Big Data Environment*.

Zhu, K., Kraemer, K. L., & Xu, S. (2002). A Cross-Country Study of Electronic Business Adoption Using the Technology-Organization-Environment Framework. *Proceedings of the International Conference on Information Systems (ICIS)*, *0085852*, 337–348.